

(Adopted December 1, 1978)(Amended July 8, 1983)(Amended November 6, 2009)

RULE 1111. REDUCTION OF NO_x EMISSIONS FROM NATURAL-GAS-FIRED, FAN-TYPE CENTRAL FURNACES

(a) Purpose and Applicability

The purpose of this rule is to reduce NO_x emissions from natural gas-fired, fan-type central furnaces, as defined in this rule. This rule applies to manufacturers, distributors, sellers and installers of residential and commercial fan-type central furnaces, requiring either single-phase or three-phase electric supply, used for comfort heating with a rated heat input capacity of less than 175,000 BTU per hour; or, for combination heating and cooling units, a cooling rate of less than 65,000 BTU per hour.

(ab) Definitions

(1) ANNUAL FUEL UTILIZATION EFFICIENCY (AFUE) is defined in Section 10.1 of Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N.

(2) BTU means British thermal unit or units.

(3) CONDENSING FURNACE means a high-efficiency furnace that uses a second heat exchanger to extract the latent heat in the flue gas by cooling the combustion gasses to near ambient temperature so that water vapor condenses in the heat exchanger, is collected and drained.

(4) FAN TYPE CENTRAL FURNACE~~an Type Central Furnace~~ is a self-contained space heater providing for circulation of heated air at pressures other than atmospheric through ducts more than 10 inches in length that have:

(A) ~~an input rate~~ RATED HEAT INPUT CAPACITY of less than 175,000 BTU~~/per hour~~;

(B) for combination heating and cooling units, a cooling rate of less than 65,000 BTU~~/per hour~~.

~~(2) Annual Fuel Utilization Efficiency (AFUE) is defined in Section 4.2.35 of Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N.~~

(5) HEAT INPUT means the higher heating value of the fuel to the furnace measured as BTU per hour.

- (6) NO_x EMISSIONS means the sum of nitrogen oxide and nitrogen dioxide (oxides of nitrogen) in the flue gas, collectively expressed as nitrogen dioxide.
- (7) RATED HEAT INPUT CAPACITY means the gross HEAT INPUT of the combustion device.
- (8) RESPONSIBLE OFFICIAL means:
 - (A) For a corporation: a president or vice-president of the corporation in charge of a principal business function or a duly authorized person who performs similar policy-making functions for the corporation, or
 - (B) For a partnership or sole proprietorship: general partner or proprietor, respectively.
- (9) SINGLE FIRING RATE means the burners and control system are designed to operate at only one fuel input rate and the control system cycles burners between the maximum heat output and no heat output.
- (310) ~~USEFUL HEAT DELIVERED TO THE HEATED SPACE~~^{seful-Heat Delivered to the Heated Space} is the AFUE (expressed as a fraction) multiplied by the heat input.
- (11) VARIABLE FIRING RATE means the burners and control system are designed to operate at more than one fuel input rate and the control system cycles burners between two or more heat output rates and no heat output.
- (12) WEATHERIZED means designed for installation outside of a building, equipped with a protective jacket and integral venting, and labeled for outdoor installation.

(b)(c) Requirements

- (1) A manufacturer shall not, after January 1, 1984, manufacture or supply for sale or use in the South Coast Air Quality Management District natural-gas-fired, fan-type central furnaces, unless such furnaces meet the requirements of ~~sub~~paragraph (c)(3).
- (2) A person shall not, after April 2, 1984, sell or offer for sale within the South Coast Air Quality Management District natural-gas-fired, fan-type central furnaces unless such furnaces meet the requirements of ~~sub~~paragraph (c)(3).

- (3) Natural-gas-fired, fan-type central furnaces shall:
- (A) not emit more than 40 nanograms of oxides of nitrogen (calculated as NO₂) per joule of useful heat delivered to the heated space; and
 - (B) be certified in accordance with ~~paragraph subdivision~~ (ed) of this rule.
- (4) On or after October 1, 2012, a person shall not manufacture, supply, sell, offer for sale, or install, for use in the South Coast Air Quality Management District, natural-gas-fired, fan-type central furnaces subject to this rule, unless such furnace complies with the applicable emission limit and compliance date set forth in Table 1 and is certified in accordance with subdivision (d) of this rule.

Table 1 – Furnace NO_x Limits and Compliance Schedule

<u>Compliance Date</u>	<u>Equipment Category</u>	<u>NO_x Emission Limit (nanograms/Joule *)</u>
<u>October 1, 2012</u>	<u>Mobile Home Furnace</u>	<u>40</u>
<u>October 1, 2014</u>	<u>Condensing Furnace</u>	<u>14</u>
<u>October 1, 2015</u>	<u>Non-condensing Furnace</u>	<u>14</u>
<u>October 1, 2016</u>	<u>Weatherized Furnace</u>	<u>14</u>
<u>October 1, 2018</u>	<u>Mobile Home Furnace</u>	<u>14</u>

* Nanograms of oxides of nitrogen (calculated as NO₂) per joule of useful heat delivered to the heated space

(ed) Certification

- (1) The manufacturer shall have each appliance model tested in accordance with the following:
- (A) Oxides of nitrogen measurements, test equipment, and other required test procedures shall be in accordance with ~~methods approved by the Executive Officer~~ AQMD Method 100.1.
 - (B) Operation of the furnace shall be in accordance with the procedures specified in Section 3.14.0 of Code of Federal Regulations, Title 10, Part 430, Subpart B, Appendix N.

- (2) One of the two formulas shown below shall be used to determine the nanograms of oxides of nitrogen per joule of useful heat delivered to the heated space:

$$N = \frac{4.566 \times 10^4 \times P \times U}{H \times C \times E},$$

$$N = \frac{3.655 \times 10^{10} \times P}{(20.9 - Y) \times Z \times E}$$

Where:

N = nanograms of emitted oxides of nitrogen per joule of useful heat.

P = concentration (ppm volume) of oxides of nitrogen in flue gas as tested.

U = volume percent CO₂ in water-free flue gas for stoichiometric combustion.

H = gross heating value of fuel, BTU/cu.ft. (60°F, 30-in. Hg).

C = measured volume percent of CO₂ in water-free flue gas, assuming complete combustion and no CO present.

E = AFUE, percent (calculated using Table 2).

Y = volume percent of O₂ in flue gas.

Z = heating value of gas, joules/cu. meter (0.0°C, 1 ATM).

- (3) At least 120 days prior to the date a furnace model is first shipped to a location in the AQMD for use in the District, ~~T~~he manufacturer shall submit to the Executive Officer the following:

- (A) A statement that the model is in compliance with sub~~section~~division (b~~c~~). (The statement shall be signed by a responsible official and dated, and shall attest to the accuracy of all statements.)
- (B) General Information
- (i) Name and address of manufacturer.
 - (ii) Brand name.
 - (iii) Model number, as it appears on the furnace rating plate.
- (C) A description of the furnace and specifications for each model being certified.

(D) Executive Officer approved emission test protocol and emission test results verifying compliance with the applicable NOx limit specified in Table 1.

(de) Identification of Compliant Units

(1) The manufacturer shall display the model number of the furnace complying with subsection divisions (bc) and (d) shall display the following on the shipping container label and rating plate of the furnace:

(A) Model number;

(B) Heat input capacity;

(C) Applicable NOx emission level limit in Table 1; and

(D) Date of manufacture or date code.

(2) Any non-certified furnace shipped to a location in the South Coast Air Quality Management District for distribution or sale outside of the District shall have a label on the shipping container identifying the furnace as not certified for use in the District.

(ef) Enforcement

(1) The Executive Officer may require the emission test results to be provided when deemed necessary to verify compliance.

(2) The Executive Officer may periodically conduct such tests as are deemed necessary to insure compliance with subsection division (bc), (d), (e) and (h).

(fg) Exemptions

(1) The provisions of this rule shall not apply to furnaces installed in mobile homes before October 1, 2012.

(2) The provisions of this rule shall not apply to natural gas fired, fan-type central furnaces utilizing three-phase electrical current until January 1, 1986.

(2) For furnaces manufactured, purchased and delivered to the South Coast Air Quality Management District prior to the applicable compliance date in Table 1, any person may, until 300 days after the applicable compliance date, sell, offer for sale, or install such a furnace in the District, so long as

the furnace meets the requirements of paragraph (c)(3) and subdivisions (d) and (e).

(h) Rebate Incentives for Early Compliance

Any manufacturer of natural gas-fired, fan-type central furnaces subject to this rule that distributes and sells into the District furnaces that comply with the 14 nanograms/Joule emission limit 90 days prior to the applicable compliance date in Table 1 of paragraph (c)(4) may submit a compliance plan for early compliance to the Executive Officer and to receive on a first-come first-served basis from the AQMD a rebate payment of \$75 for each 14 nanograms/Joule certified furnace and \$90 for each high efficiency 14 nanograms/Joule certified furnace with AFUE of 90% or greater distributed and sold into the District, provided funds are available on the date documentation on the number of units distributed and sold is submitted to the AQMD. Total rebate payments to all manufacturers shall not exceed \$3,000,000.

(i) Technology Assessment

On or before April 1, 2013, the Executive Officer shall conduct a technology assessment and shall report to the Governing Board on the status of manufacturers' progress towards compliance with the 14 nanograms/Joule emission limit for nitrogen oxidees.